Cloud Computing @ HP Labs

Máster en Computación de Altas Prestaciones, CESGA

Juan Angel Lorenzo del Castillo / May 24, 2012

Introduction

Juan Ángel Lorenzo del Castillo

B.Sc. in Telecom Engineering majoring Electronics from the University of Valladolid (Spain).
M.Sc. in Telecom Engineering from the University of Valladolid (Spain).
M.Sc. in Distributed Systems. Inter-university Doctorate Program, USC-UDC (Spain).
Ph.D. from the University of Santiago de Compostela (Spain).

Visiting researcher at the EPCC (The University of Edinburgh) and the Charles University in Prague.
Collaborations with HP Labs USA

Assistant lecturer at the University of Santiago de Compostela.
Lecturer and lab instructor in several computing courses.
Collaborations in open source communities in Spain.

Industrial experience at the Centre for Telecommunication Development in Spain.
Currently working at the Cloud and Security Lab (HP Labs, Bristol) as a researcher. Interested in:

- Cloud computing systems.
- Virtualisation.
- Operating systems programming.
- Performance monitoring of large-scale architectures.
- Data profiling in real and virtualised environments.

Involved in the EU BonFIRE project

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Agenda

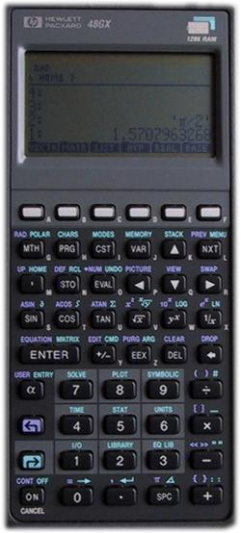
HP Labs

Cloud Computing

HP Cloud

Hewlett -Packard

The printing company, right?



Hewlett-Packard Laboratories

Exploratory and advanced research group for Hewlett-Packard

Focused on the future

Not bound by day-to-day business concerns

Hewlett-Packard Laboratories

Cloud & Security

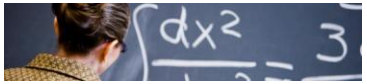
Information Analytics

Intelligent infrastructure

Mobile and Immersive Experience

Networking and Communications

Print Content



Services

Sustainability

HP Labs Bristol

What is The Cloud?

Cloud Computing: Origins

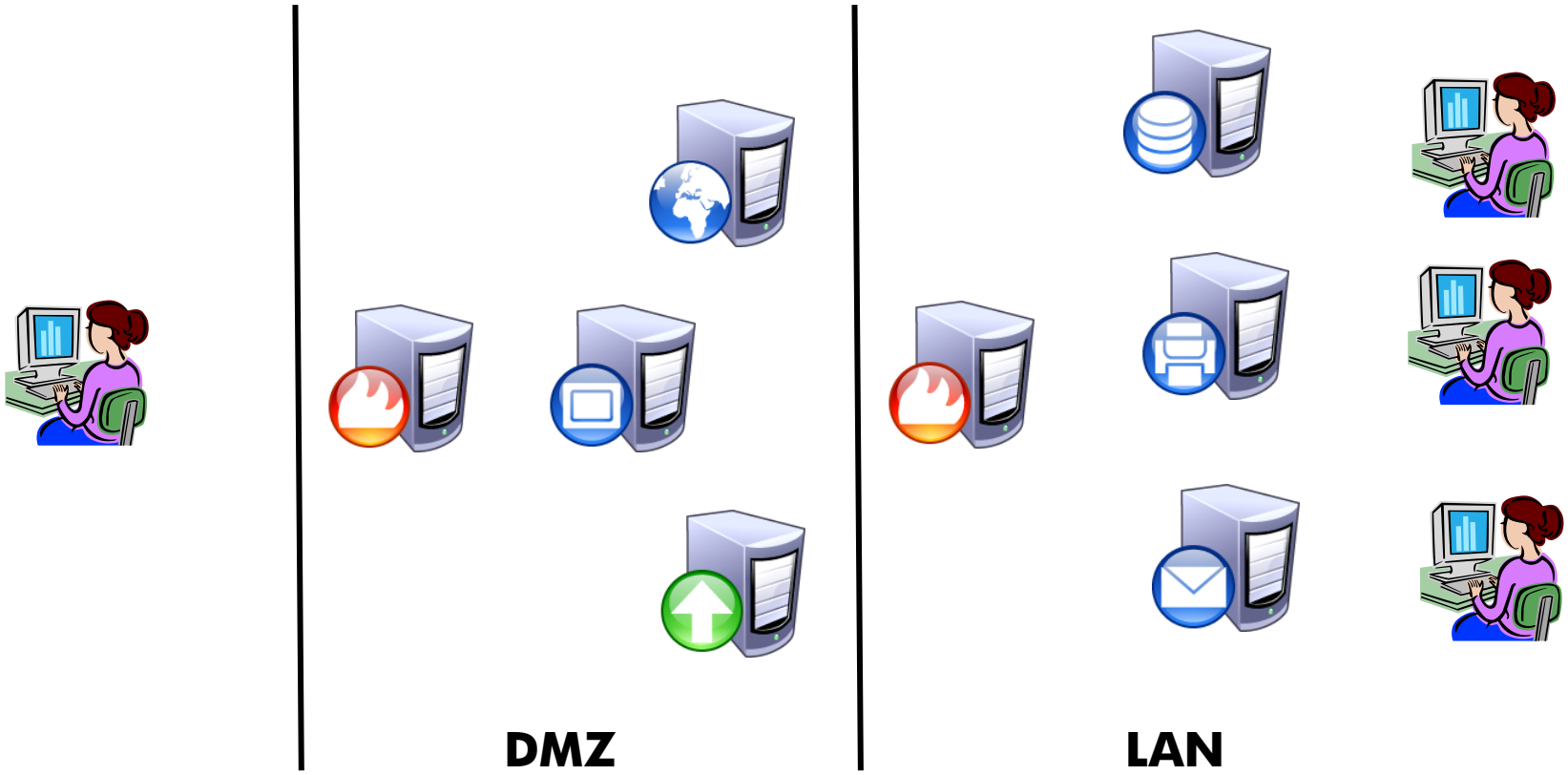
Need for Utility Computing

Underutilised Resources

Evolution of Virtualisation Technology

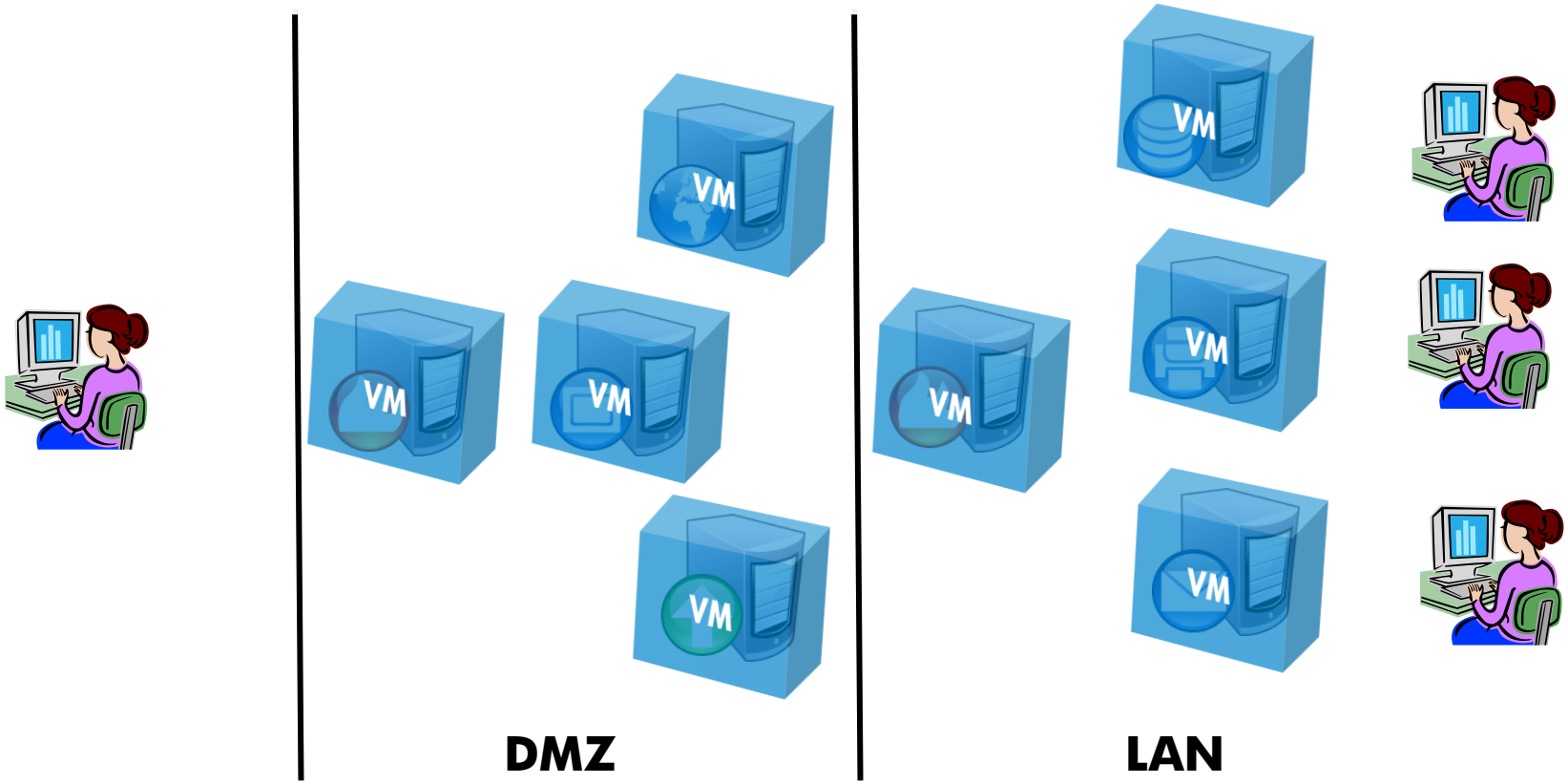
Cloud Computing: Origins

Traditional approach



Cloud Computing: Origins

Virtualisation approach

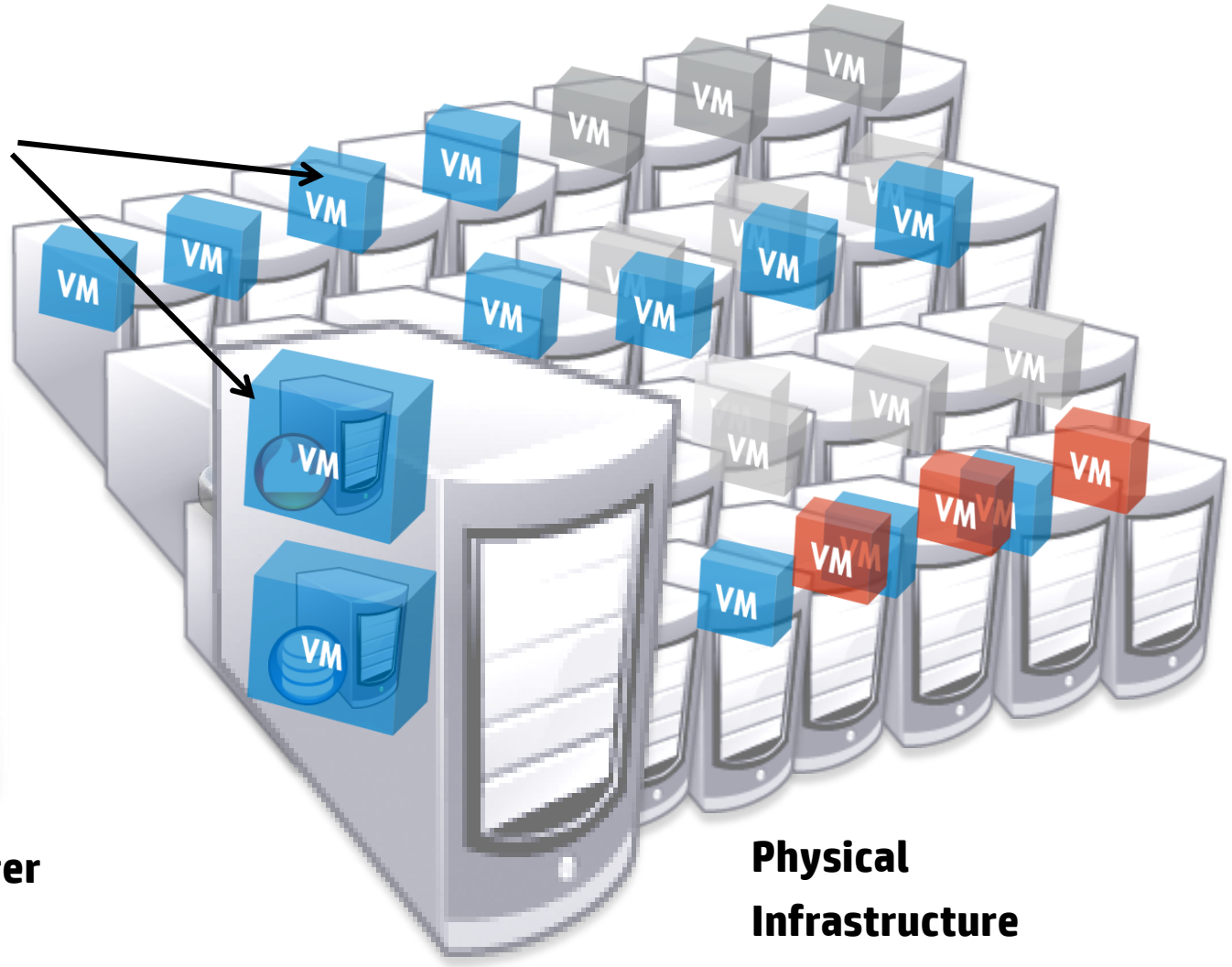


Cloud Computing: Origins

Virtualisation approach

Virtualised Services

Cloud Manager



Physical Infrastructure

Cloud Definition *

Virtualisation

Scalability and Elasticity

Resource optimisation

Pay-per-use

SLAs

Virtualisation

Virtualisation

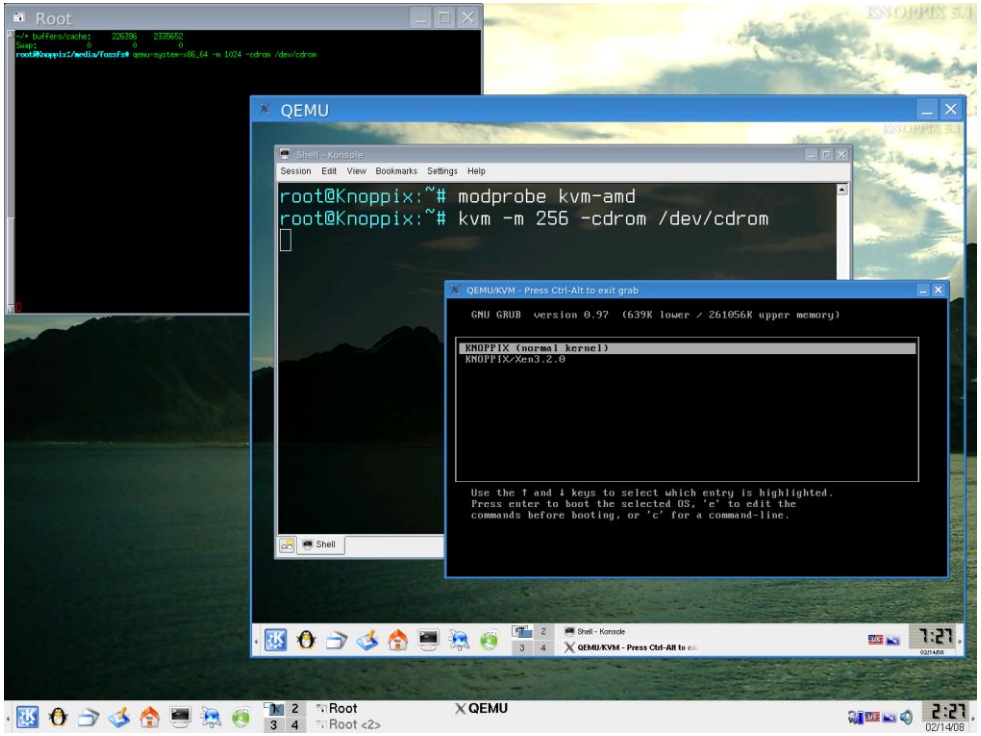
Hardware Infrastructure

Guest OS

Virtualised Environment

Creation of a virtual (rather than actual) version of something, such as a hardware platform, operating system, storage device, or network resources (Wikipedia)

Virtualisation



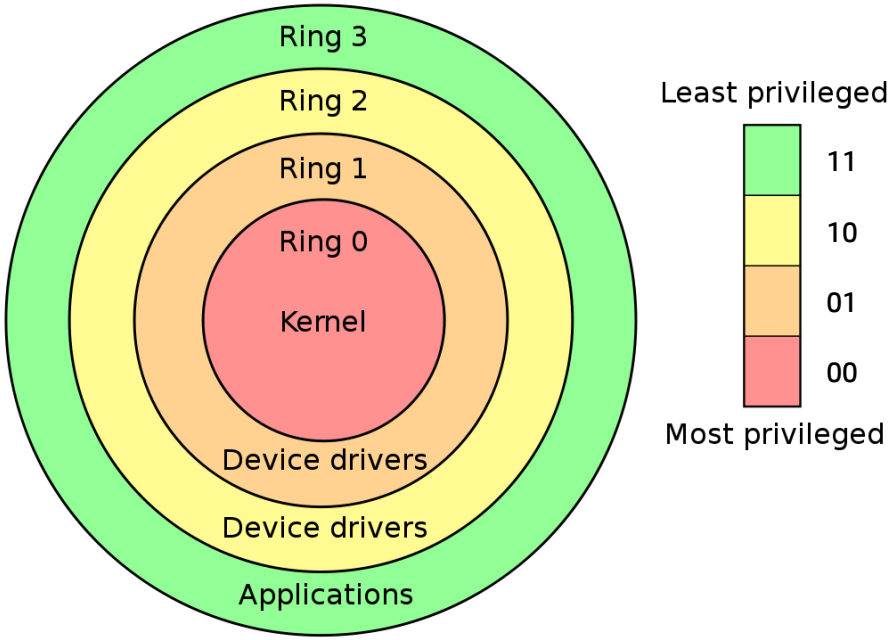
Virtualisation

Binary Translation

Paravirtualisation

Hardware Virtualisation

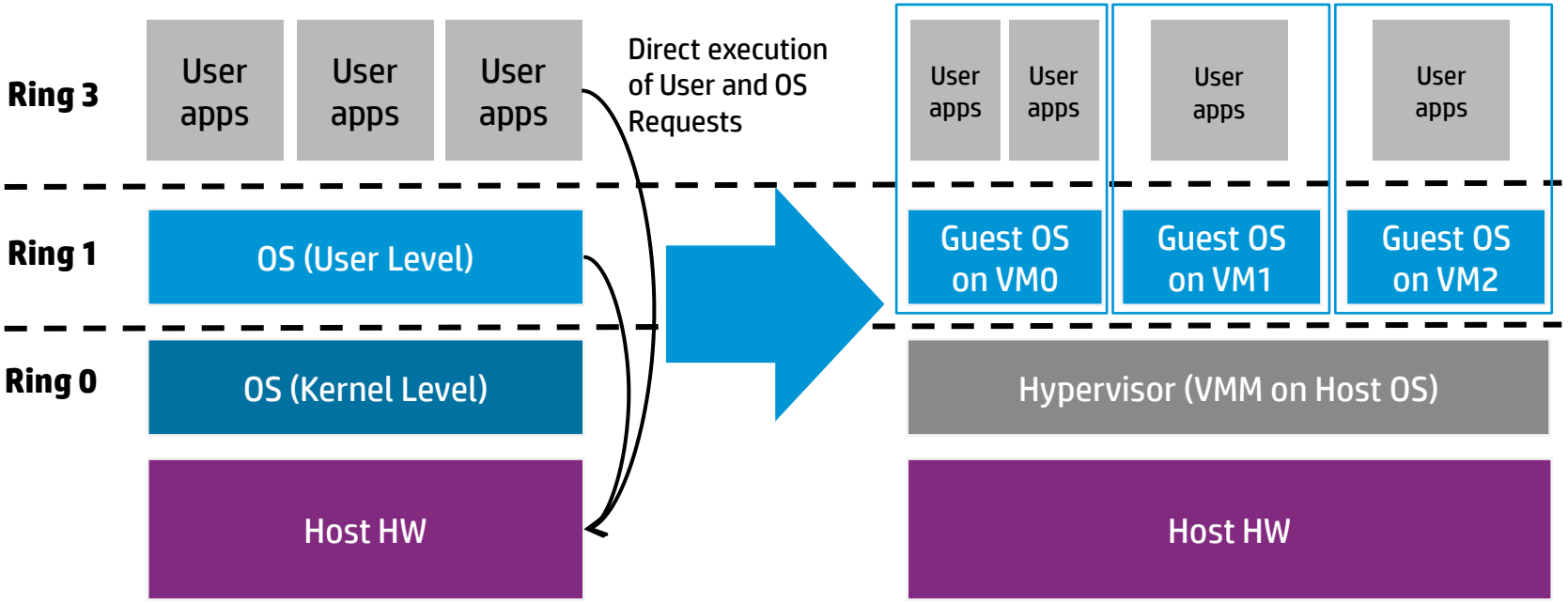
Privilege Rings



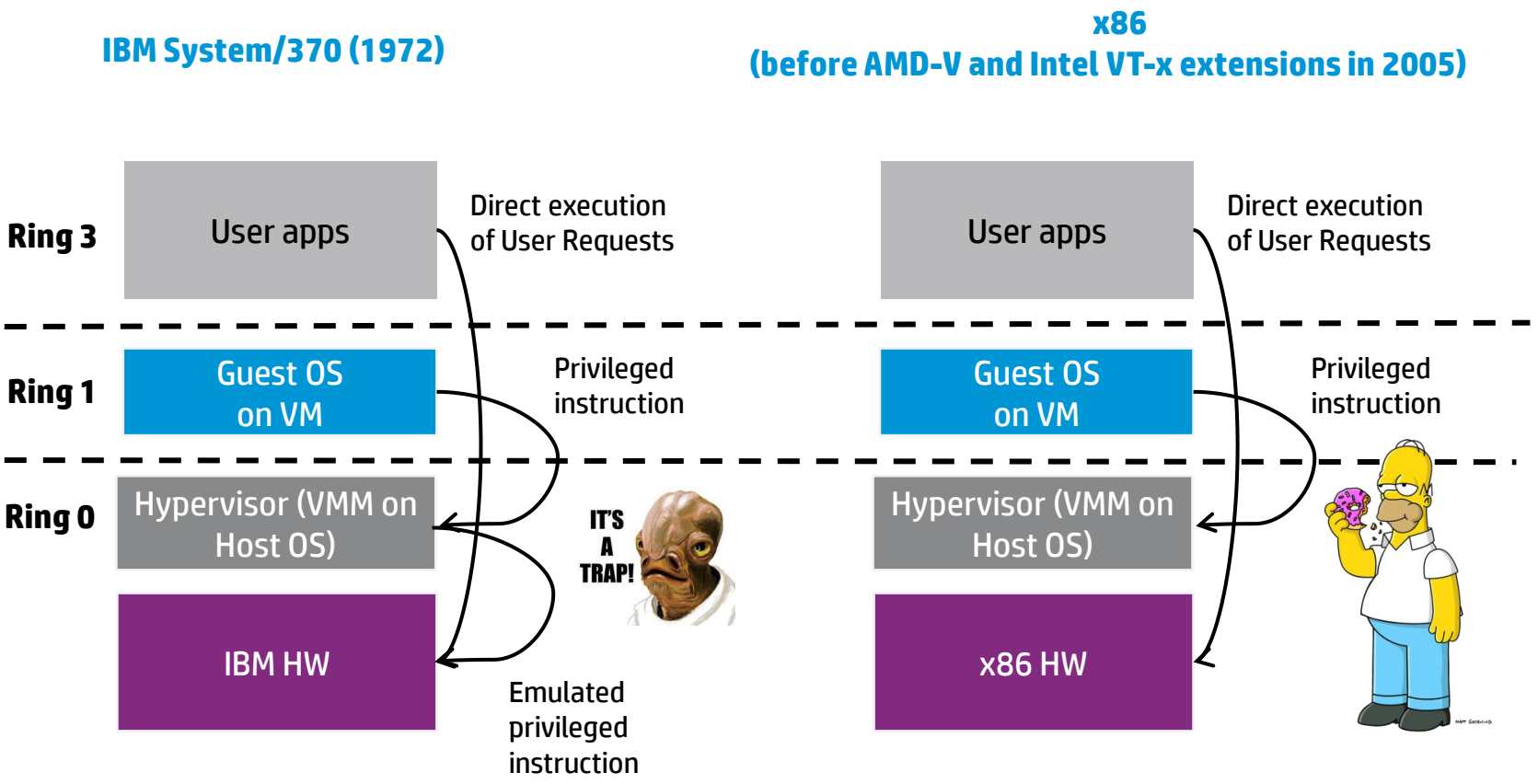
Privilege levels on a modern Operating System
(*Source:: Wikipedia*)

Hypervisor

Ring deprivileging



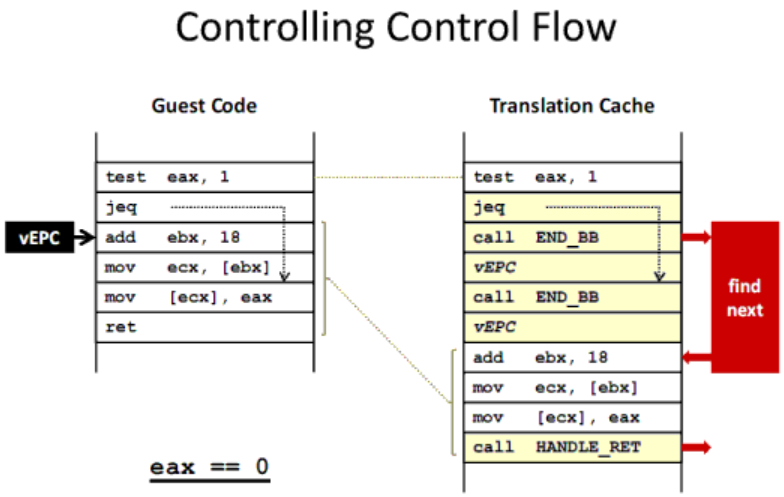
Virtualisation Challenges



Binary Translation

Changes "critical" or "dangerous" code into harmless code on the fly

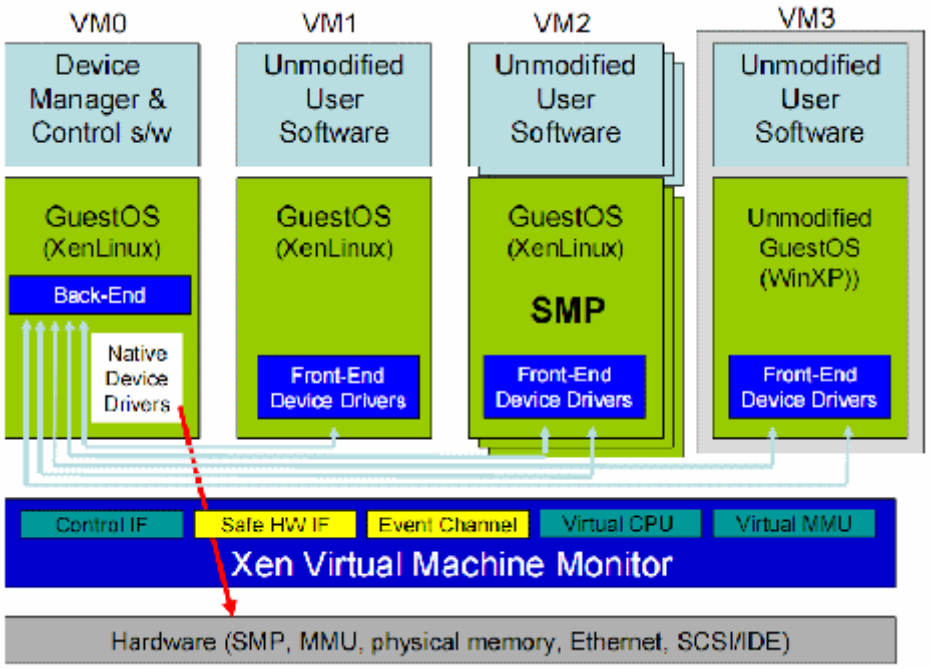
x86 (1999)



(*Source:: VmWare*)

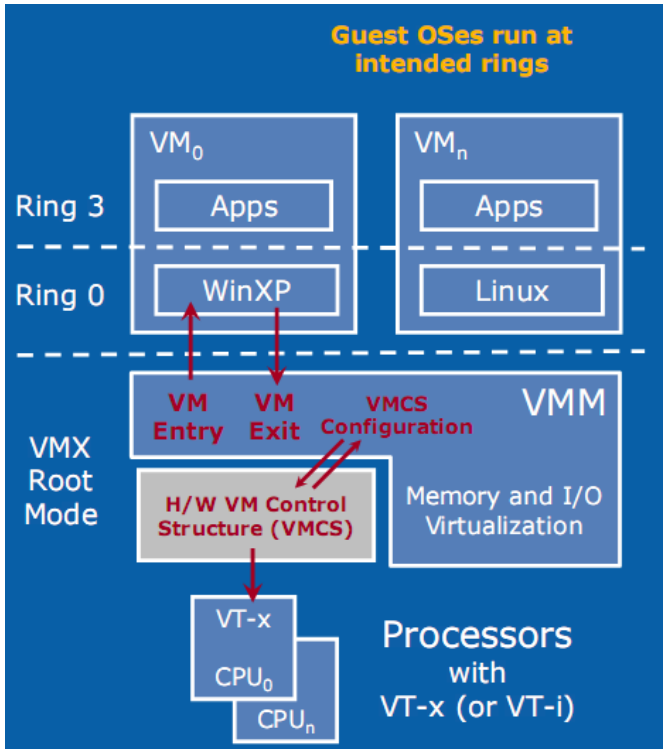
Paravirtualisation

Changes "critical" or "dangerous" code into harmless code ***in the source code***



(*Source: Xen)*

Hardware Virtualisation



(*Source:: VmWare*)

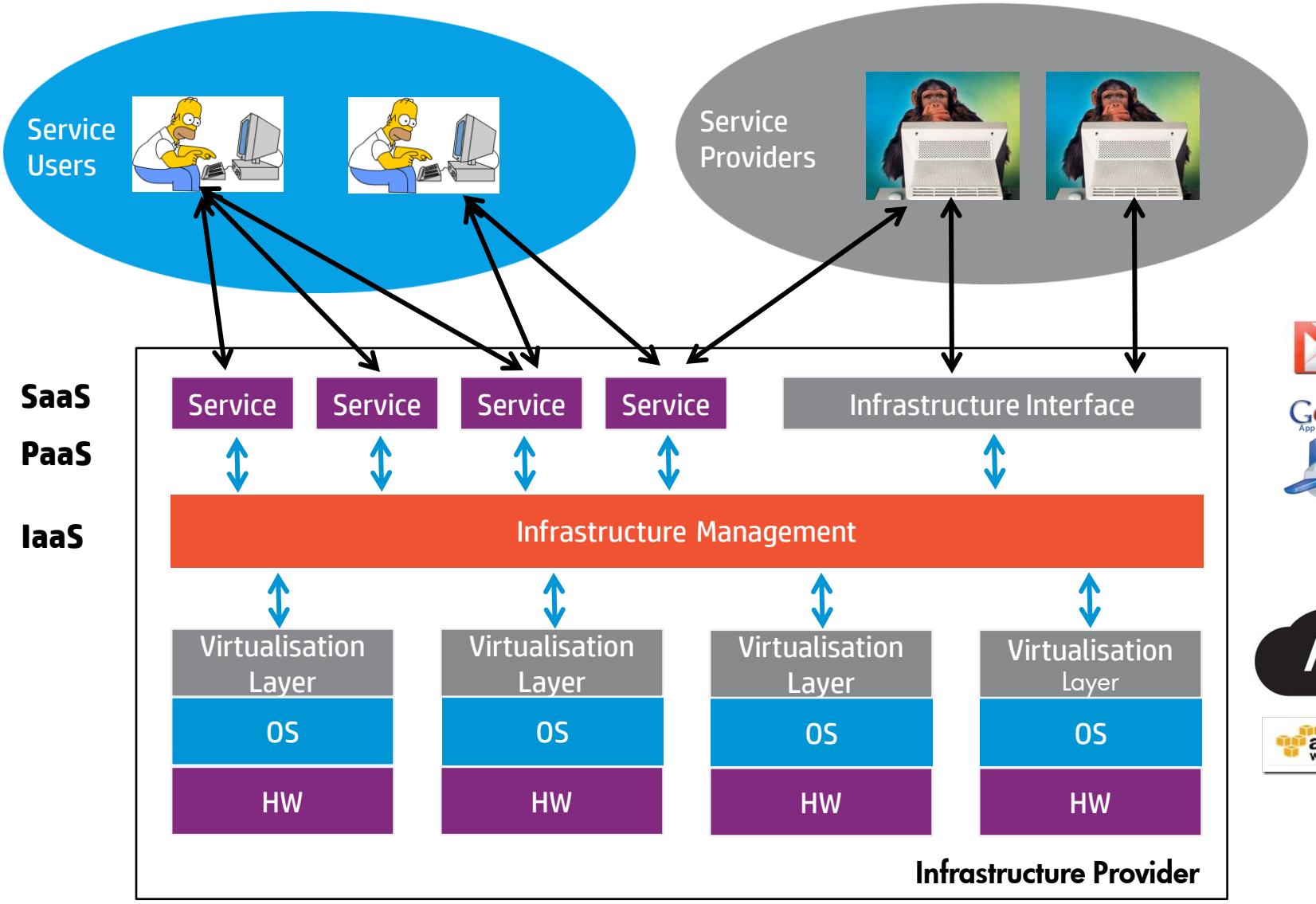
Hypervisor Types

Type I (Bare Metal)

Type II

Cloud Infrastructures

Cloud Actors and Scenarios



Available infrastructures

Private Cloud

Public Cloud

Hybrid Cloud

openstack

Eucalyptus Systems

cloudstack

OpenNebula

hp

amazon web services

Cloud Computing…

… for CIOs (Chief Information Officers)

I know the public cloud is good for business. But how can I take advantage of the vast array of cloud resources while retaining control and governance? How can I make public and hybrid cloud sourcing part of my IT strategy? And how can I possibly manage it all?

… for the Operations Team

New roles. Operation teams will be freed up from the day-to-day logistics of managing the infrastructure and will instead get to focus on high-level problems such as automation, security, and analytics

… for Developers

Would the decision to move an existing business application from dedicated in-house servers to a public cloud provider result in significant reworking of the program's code?

New paradigm: *Software Testing In The Cloud* (STITC)

… for Users

Flexibility to have resources on demand

HP CloudSystem

Cloud Computing…

HP CloudSystem Matrix

On-premise cloud solution that provides infrastructure as a service (IaaS) for IT, along with basic application deployment and monitoring.

HP CloudSystem Enterprise

For organizations looking to deploy a full range of service models (IaaS, PaaS, and SaaS), along with advanced application lifecycle management.

HP CloudSystem Service Provider

Addresses the requirements of service providers to deliver public cloud IaaS and SaaS, including aggregation and management for those services

HPCS

HP Cloud
Compute

HP Cloud
Object Storage

HP Cloud
CDN

HP Cloud
Block Storage

HP Cloud
Relational Database
for MySQL

HP Cloud
Identity Service

Hands On!

Thank you